

AMENDMENTS TO THE CLAIMS

1. (Currently amended) A radio-frequency amplifier comprising:

a substrate;

an input-side line portion ~~which is formed on a~~ the substrate and including,
~~which has an input slot line having a shorted end whose one end is shorted, the input-~~
side line portion inputting and which is used to input an electromagnetic-field-mode
signal whose magnetic field is parallel to the input slot line into the input slot line;

an output-side line portion formed on the substrate and including an output
slot line arranged ~~which is~~ substantially parallel to the input slot line, the output slot
line having a shorted end and whose one end is shorted; and

a transistor which includes a ~~coplanar~~ connecting portion in which source
electrodes are arranged on ~~both~~ opposite sides of a gate electrode, and a drain electrode
arranged along a ~~straight~~ common line with the gate electrode, wherein the transistor
~~and which~~ is mounted on the substrate such that the gate electrode is positioned on the
input slot line side, ~~that~~ the drain electrode is positioned on the output slot line side,
and ~~that the orientation of arrangement of~~ the gate electrode and the drain electrode are
oriented is perpendicular to the input slot line and the output slot line.

2. (Currently amended) The radio-frequency amplifier according to Claim 1,

wherein the input-side line portion includes ~~the input slot line,~~ a first DC cut
line which branches off at ~~almost~~ substantially 90 degrees from the input slot line to ~~an~~
a first edge of the substrate ~~and which has a short stub of a predetermined length at the~~
~~middle thereof,~~ and a second DC cut line which branches off from the input slot line at
a second point ~~far from the one end of the input slot line~~ relative to the first DC cut line
to the first edge of the substrate ~~and which has a short stub of a predetermined length~~
~~at the middle thereof,~~

wherein the output-side line portion includes ~~the output slot line~~, a third DC cut line which branches off from the output slot line in ~~the~~ a direction opposite to the first DC cut line to ~~an~~ a second edge of the substrate ~~and which has a short stub of a predetermined length at the middle thereof~~, and a fourth DC cut line which branches off from the output slot line at a second point ~~far from the one end of the output slot line~~ relative to the third DC cut line in ~~the~~ a direction opposite to the second DC cut line to the second edge of the substrate ~~and which has a short stub of a predetermined length at the middle thereof~~, and

wherein the transistor is mounted on the substrate such that the gate electrode of the connecting portion is connected to a first DC electrode separated by the first DC cut line and the second DC cut line of the input-side line portion and that the drain electrode is connected to a second DC electrode separated by the third DC cut line and the fourth DC cut line of the output-side line portion, ~~so that the orientation of arrangement of the gate electrode and the drain electrode is perpendicular to the input slot line and the output slot line~~, and such that the ~~both~~ source electrodes are connected to a ground electrode separated by the input slot line, the first DC cut line, the output slot line, and the third DC cut line.

3. (Currently amended) The radio-frequency amplifier according to Claim 1 ~~or 2~~, wherein the gate electrode and the drain electrode of the transistor are arranged placed before the one ends of the input slot line and the output slot line, respectively, by a distance of 1/4 wavelength from the shorted ends of the input slot line and the output slot line, respectively.

4. (Currently amended) The radio-frequency amplifier according to Claim 13 ~~2 or 3~~,

wherein ~~the short stubs of~~ the first and second DC cut lines include stubs that are located ~~are placed at positions of~~ $1/4$ wavelength from branch points of the input slot line, and

wherein ~~the short stubs of~~ the third and fourth DC cut lines include stubs that are located ~~are placed at positions of~~ $1/4$ wavelength from branch points of the output slot line.

5. (Currently amended) The radio-frequency amplifier according to Claim 1 ~~any of Claims 1 to 4~~, wherein an air bridge to electrically connect the ~~both~~ source electrodes is provided in the connecting portion of the transistor.

6. (Currently amended) The radio-frequency amplifier according to Claim 2 ~~any of Claims 2 to 5~~, wherein a part of the input slot line between the first DC cut line and the second DC cut line is curved toward the output slot line side and a part of the output slot line between the third DC cut line and the fourth DC cut line is curved toward the input slot line side so that pad portions are formed on the first and second DC electrodes, and wherein the gate electrode and the drain electrode are connected to the pad portions of the first and second DC electrodes, respectively.

7. (Currently amended) The radio-frequency amplifier according to Claim 2 ~~any of Claims 2 to 6~~, wherein the connecting portion of the transistor faces the substrate, and wherein the gate electrode, the drain electrode, and the ~~both~~ source electrodes are connected to the first and second DC electrodes and the ground electrode, respectively, ~~in a flip chip method~~ using bumps.

8. (Currently amended) The radio-frequency amplifier according to Claim 2 ~~any of Claims 2 to 6~~, wherein ~~the connecting portion of the transistor is oriented to the side opposite to the substrate~~, wherein the gate electrode and the drain electrode are

connected to the first and second DC electrodes, respectively, via wires, and wherein the ~~both~~ source electrodes are connected to the ground electrode via through holes provided in the transistor.

9. (Currently amended) The radio-frequency amplifier according to Claim 6, ~~wherein the connecting portion of the transistor is oriented to the side opposite to the substrate, and~~ wherein the gate electrode, the drain electrode, and the ~~both~~ source electrodes are connected to the pad portions of the first and second DC electrodes and the ground electrode, respectively, via through holes provided in the transistor.

10. (Currently amended) The radio-frequency amplifier according to Claim 1 ~~any of Claims 1 to 9~~, wherein one or more heat-dissipating through holes are provided in a portion of the substrate corresponding to a connecting position of the transistor.

11. (Currently amended) A radio-frequency wireless communication apparatus comprising:

a mixer to receive an intermediate-frequency signal and a local oscillation signal from a local oscillator through a slot line, convert the intermediate-frequency signal to a radio-frequency signal, and output the radio-frequency signal through a slot line;

a ~~the~~ radio-frequency amplifier according to Claim 1 ~~any of Claims 1 to 10~~ to receive the radio-frequency signal from the mixer through ~~an~~ the input slot line of ~~an~~ the input-side line portion and amplify the signal; and

a slot antenna to transmit the radio-frequency signal output from ~~an~~ the output slot line of ~~an~~ the output-side line portion of the radio-frequency amplifier.

12. (Currently amended) The radio-frequency wireless communication apparatus according to Claim 11, further comprising:

a second ~~the~~ radio-frequency amplifier according to Claim 1 ~~any of Claims 1 to 10~~ to receive a reception radio-frequency signal received by the slot antenna through the input slot line of the input-side line portion and amplify the reception radio-frequency signal; and

a mixer to receive the reception radio-frequency signal output from the output slot line of the output-side line portion of the second radio-frequency amplifier and a local oscillation signal from the local oscillator through a slot line, convert the radio-frequency signal to an intermediate-frequency signal, and output the intermediate-frequency signal through a slot line.

13. (New) The radio-frequency amplifier according to Claim 2, wherein at least one of the first, second, third and fourth DC cut lines has a stub.